# RUNOFF RACE

## **Objectives:**

Using this adapted Project WOW activity students will:

- compare the rate at which water travels down slopes with and without plant cover,
- describe where the water goes if it does not travel downslope,
- develop an understanding of how plant cover can help filter water and affect the quality and quantity of groundwater.

#### **Materials:**

- A quart jar with a lid
- Pebbles, sand, dirt, clay, crushed leaves
- Piece of artificial turf
- 2 sheets of wood or plastic similar in size
- 2 shallow pans
- 2 containers of water equal size
- Something to prop up the models so they tilt
- Copies of pictures with and without plant cover
- Soil Erosion by Water booklet





# **Background:**

Show students pictures of hillsides that are covered with vegetation. Ask them to imagine a gentle rain falling on these slopes. What do they think would happen to the water? Now show photographs of hillsides with barren slopes. How would rainfall affect these areas? Compared to the previous sites? Discuss how flowing water carries sediments of different sizes. The faster the flow, the larger the sediment particles that can be carried. As the water slows, the larger particles settle out first. In still water, the finer sediments (clay and silt) will settle to the bottom.

#### **Procedure:**

- 1. Prepare the two boards, one with the artificial turf, one without.
- 2. Have the students predict which board will allow the water to flow more freely, the one with the turf, which represents plant cover or the board without cover. Discuss why. Using the two containers filled with water, ask two volunteers to pour water simultaneously onto the high end of each model. Discuss the flow rate. In which model does the water travel faster?
- 3. Discuss how the plant cover (turf) in the first race could filter the water as it travels down slope. Have student predict what would happen to the uncovered soil or surface on the other board? How would that affect the water in the watershed? Would there be erosion? Why?
- 4. Add sediment to the two containers of water. Ask two volunteers to pour water simultaneously onto the high end of each model. In which model does more sediment settle out? Which would have cleaner water flowing from it?

### **Extension:**

How does plant cover within the watershed affect a lake? To introduce how lakes can be affected by surrounding areas with and without plant cover, try the following. Show students a clear glass of water and pour in some sand or soil. Note how materials begin to settle out. Explain that this happens when water is standing in a lake. Discuss how a lake could be affected by an accumulation of sediment. (If sediment continues to be deposited in the lake, over time the lake could become shallow or even fill. High levels of sediment can adversely affect aquatic plants and animals.) Discuss with the students what could be done to decrease the quantity of sediment flowing into the lake. Sedimentation is a part of the process of succession and is natural. Lakes and ponds fill with sediments, become marshes, and eventually grasslands or forests. However, human impacts can unnaturally speed the process. Concrete highways, driveways, parking lots, and areas where the vegetation was removed can cause challenges for our water resources and the organisms living there.

- 1. Mix the different sediments with water in the quart jar. The jar should be ½ to ¾ full of sediment; top off with water. Have a student shake the jar until the contents are thoroughly mixed and set the jar on a table in front of the class. Have the students predict which sediments will settle faster.
- 2. As the class watches the sediments settle, discuss how plant cover within the watershed can reduce sediments in the water. Discuss reasons muddy water can be harmful to wildlife. (Muddy water clogs filter feeders such as clams; clogs and abrades fish gills; smothers fish eggs; blocks sunlight and impairs plant growth; "blinds animals" that hunt for food by sight; etc.) Would more sediment settle to the bottom if the water were flowing quickly, or slowly? (Slower flow, like a lake compared to a stream, allows even small particles to settle out.)
- 3. Describe how the particles are settling in the jar. (In layers: largest or heaviest particles settle first; fine or light particles may remain in suspension.)
- 4. Describe how wetlands at the edge of large bodies of water and their plants can slow and filter the flow of water by simply being in the way.

Refer to the Soil Erosion By Water booklet for more information if desired